CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

Semarang City is the most significant contributor to the vast land dynamics in the coastal of the Semarang Metropolitan area. This statement has been supported by civilian agglomeration, centralization of trading and industrial facilities, location of toll gates, and reclamation activities found in Semarang City. This has been the cause of urbanization and the effect of vast land dynamics, as stated in previous research (Bulleri & Chapman, 2010; Lakshmi & Rajagopalan, 2000; Marques & Khakhim, 2016).

The location of the toll gates in Semarang Metropolitan coastal area has been expanding for its built-up area in the period of 2015-2020. Whilst, the reclamation region has also been expanding for its built-up area as well as the expansion of its mainland. The area surrounding the toll gates is predicted to trigger intensification and extensification of the built-up area. Meanwhile, the reclamation location is predicted to be partly converted as waterbody. The expansion of built-up area found in surrounding the toll gates may predict the increased land demand for economic activities. This conforms to study conducted by Lakshmi & Rajagopalan (2000). However, the effort of providing reclamation land is threatened by the expansion of the waterbody towards the mainland.

There is no spatial structure change within the last five years. The spatial structure in Semarang Metropolitan coastal area is similar to the spatial structure in the coastal area of Lasem City as suggested by Kurniati (2016), which is classified as multiple nuclei structure. Meanwhile, the spatial pattern in the study area conforms to the Kurniati's (2016) research result, which is classified as octopus pattern.

The built-up in the study area is predicted to increase by 943.12 ha (about 2.50% of the study area) within 2020-2025 and to increase again by 447.31 ha (1.18% of the study area) in 2025-2030. Paddy field and bare land are predicted to decrease by 1,921.15 ha (about 5.08% of the study area) within 2020-2025 and again continue to decrease by 1,012.54 ha (about 2.68% of the study area) in 2025-2030. The rate of the decrease of paddy field and bare land is predicted to be higher than the increase of the built-up area. The vast land dynamics are being marked by the trend of the unbuilt land shrinkage

resulting from the built-up area intensification (Bulleri & Chapman, 2010; Lotze, 2006).

The wide of the canopy in 2020, which is incompatible to the spatial pattern plan, is about 10,947.06 ha (or 28.97% of the study area). The incompatibility itself is predicted to increase by 1,241.81 ha (or 3.29% of the study area) within 2020-2030. Such an incompatibility is caused by the built-up and paddy field/bare land plan that are predicted to be converted to waterbody.

An ineffective Semarang City's spatial pattern plan is indicated by the decrease of paddy field/bare land that this contradicts the plan: the waterbody does not convert to paddy field/bare land, but it is converted to built-up in the reclamation area. This ineffectiveness indicates that the shrinkage trend of paddy field is not accommodated in the spatial pattern plan in the study area. An ineffective spatial pattern plan in the studied region is caused by vulnerability of natural disaster factor in the coastal area in the form of the increase of sea water level (Levoy *et al*., 2016; Yoo *et al*., 2011).

This research yields 90.98% and 94.50% accuracy (observed correct) at the validation stage of land cover model in 2015 and 2020, respectively. Previous research done also used low-resolution imagery (Landsat) and yielded the highest accuracy of 84.83% to 86.2% (An *et al*., 2007; Chen *et al*., 2007; Y. Zhou *et al*., 2018). A higher accuracy in this research is affected by the technique in taking a test set. This research has followed Noi & Kappas (2018) when taking the test set – by selecting samples of the test set which are not close in distance to the train set. Research done by Noi & Kappas (2018) resulted an accuracy of 94.4%. Hence, the accuracy in this research is very close to the accuracy resulted from research conducted by Noi & Kappas (2018).

The method of object-based image analysis is able to reduce the "salt-and-pepper effect" problem commonly found in the pixel-based image analysis method. Such a problem can be overcome by eliminating the object segment having a size of fewer than 10 pixels (0.4 ha). This research results in land cover prediction based on the OBIA-based model that can be used as an approach in evaluating government spatial pattern plan's effectivity. The implementation of the OBIA-based method in the assessment context of spatial regulation plan contributes to the knowledge of urban and regional planning.

5.2. Recommendations

This part firstly discusses a recommendation for regional government. The recommendation is in the form of reassessment to the paddy field/bare land plan across Semarang Metropolitan coastal area. Reclamation has not become the trend of providing paddy fields in the studied region. Hence it is recommended to conduct both structural and nonstructural mitigation for maintaining the width of the paddy field/bare land. Whereas, several recommendations to researchers are described as follows:

a. Future research is recommended to use temporal images of the paddy field after harvesting. This helps to avoid bias in classifying puddles (water concentration) in the paddy field as a waterbody. Future research must also consider the technique in taking the test set (Laban *et al*., 2019; Thanh Noi & Kappas, 2018). It is also suggested to use validation technique in predicting the land cover dynamics as suggested by Kusniawati *et al*. (2020) and Rahman *et al*. (2017) as this recommendation might improve the deficiency found in the method used in this research.
b. Future research must also consider constraint factors that limit the coastal area dynamics, such as “rob” (a local term of flood in the coastal area due to sea high-tides) and land subsidence. Future research must also consider the shrinkage of paddy field in the study area caused by coastal ecological issues such as the increase of sea-water level as well as the decrease of ground height. This recommendation is made available to future researchers so they can predict land cover model in a more relevant to conditions of the study area.
c. This research has several deficiencies related to aspects being observed in the coastal dynamics. This research emphasizes the change in physical spatial aspects. Future research is suggested to discuss aspects related to the study area in a more comprehensive way, includes social and political aspects that may affect much the coastal dynamics.